

Curriculum Vitæ

Summary: Eduardo V. Castro is an Assistant Professor at the Physics and Astronomy Department of the Faculty of Sciences of University Porto (UP). After his PhD, obtained from UP in 2008, he was a visiting post-doc at MPI-PKS in Dresden, and a Juan de la Cierva post-doc at ICMN-CSIC in Madrid. In 2012 he joined IST at University of Lisbon as an Assistant Professor, and moved to UP in 2018. He is also an associate member at CSRC – Computational Science Research Center in Beijing, China since 2012.

E. V. Castro has a background in Theoretical Condensed Matter Physics, with focus on phenomenological descriptions of 2D systems and topological matter. He is the author of 64 scientific articles (peer reviewed) and 5 book chapters, has over 3500 citations and h-index 22 (Scopus).

Since 2007, E. V. Castro has been involved in 12 research projects funded either by Portuguese or Spanish agencies, and coordinated 6 of them. Between 2016 and 2018 he coordinated an Individual Marie-Curie fellowship. Since 2015 he has supervised 13 Msc students, 5 PhD, and 3 post-docs.

He was in the organization, or belonged to the scientific committee, of 9 international scientific events since 2009 and gave invited contributions at international meetings on 12 occasions. Currently, he is the director of the Master Physics program at FCUP and the director of the research unit Centro de Física do Porto (Porto’s section of CF-UM-UP).

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1 Personal and Professional data

Personal information

Name	Eduardo Filipe Vieira de Castro
Date of birth	15th of February 1979
Nationality	Portugal

Professional status

Role	Associate Professor
Institution	Physics and Astronomy Department Faculty of Sciences of the University of Porto Porto, Portugal

Role	Permanent research member
Institution	CF-UM-UP - Centro de Física das Universidades do Minho e do Porto Faculty of Sciences of the University of Porto, Porto, Portugal

Role	Associate Member
Institution	CSRC - Computational Science Research Center Beijing, China

Contact information

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Fax	+351 220 402 406
E-mail	efvcastro@gmail.com, evcastro@fc.up.pt

Education

Ph.D. Condensed Matter Physics (Theory)

Thesis: *Correlations and disorder in electronic systems: from manganites to graphene*

Institution: Faculty of Sciences of the University of Porto, Portugal

Advisers: João M. B. Lopes dos Santos, Nuno M. R. Peres

Grade: Pass by unanimous decision (Pass or Fail)

Date: 2008

M.Sc. Condensed Matter Physics (Theoretical and Computational Physics)

Thesis: *Effects of disorder in manganites*

Institution: University of Aveiro, Portugal

Adviser: João M. B. Lopes dos Santos

Grade: Pass (Pass or Fail)

Date: 2004

Postgrad course Condensed Matter Physics (Theoretical and Computational Physics)

Institution: Universities of Aveiro, Coimbra, and Porto, Portugal

Grade: 18/20

Date: 2003

Graduation Physics

Institution: Faculty of Sciences of the University of Porto, Portugal

Grade: 17/20

Date: 2001

Languages

Portuguese Fluent (native)

English Fluent (First Certificate in English, University of Cambridge,
ESOL examinations 2006, Grade A)

French Fluent (5 years study at middle/high school)

Spanish Fluent

2 Scientific curriculum

2.1 Productivity

>4700 citations, h=24 (Google Scholar)

>4100 citations, h=25 (ResearchGate)

>3500 citations, h=22 (Scopus)

>3300 citations, h=21 (Web of Science)

Scopus ID: 24466388300

ResearcherID: D-4413-2009

ORCID: 0000-0002-0993-3734

Articles

77 papers: 64 published, 13 submitted

- 12 Physical Review Letters - IF 9.19
- 1 2D-Materials - IF 7.69
- 1 SciPost Physics - IF 6.43
- 27 Physical Review B - IF 3.9
- 1 Physical Review Research
- 1 New Journal of Physics - IF 3.9
- 3 Physical Review A - IF 3.0
- 5 Journal of Physics: Condensed Matter - IF 2.7
- 3 Europhysics Letters - IF 1.9

A detailed list is provided in Appendix A.

Book Chapters

5 chapters

A detailed list is provided in Appendix B.

2.2 Projects

2022-2023 Non-trivial topological phases of incommensurate two-dimensional electronic systems

Funding agency: FCT, Portugal

Advanced Computing Projects (FCT/CPCA/2021/01)

Role: coordinator

Ref. CPCA/A1/470243/2021

Funding: 100 000 CPU core*hours (~ 1 246€)

2022 Quantum Matter - Materials & Concepts – Summer Training Program 2022

Funding agency: FCT, Portugal

“Verão com Ciência” program: 7 scholarships for 1 month

Role: project coordinator and supervisor of 1 scholarship

Funding: 3 122.84 €

2021 Quantum Matter - Materials & Concepts – Summer Training Program 2021

Funding agency: FCT, Portugal

“Verão com Ciência” program: 7 scholarships for 1 month

Role: project coordinator and supervisor of 3 scholarships

Funding: 3 122.84 €

- 2020-2021** Magic-Angle Graphene Bilayer
Sponsored by Computational Science Research Centre, Beijing, China
Role: member
Resources: 1 375 000 core*hours,
- 2020-2021** Effects of disorder in nodal loop semimetals
Funding agency: FCT, Portugal
Advanced Computing Projects (FCT/CPCA/2020/01)
Role: coordinator
Ref. CPCA/A00/7421/2020
Funding: 25 000 CPU core*hours
- 2020-2021** Incommensurability effects in low-dimensional Quantum Materials
Funding agency: FCT, Portugal
Advanced Computing Projects (FCT/CPCA/2020/01)
Role: member
Ref. CPCA/A00/7343/2020
Funding: 25 000 CPU core*hours
- 2020** Quantum Matter - Materials & Concepts – Summer Training Program 2020
Funding agency: FCT, Portugal
“Verão com Ciência” program: 10 scholarships for 3 months
Role: supervisor of 2 scholarships
Funding: 26 334.00 €
- 2016-18** *Vertical Transport and Photoresponse in van der Waals hybrid structures*
Bruno Amorim’s Marie Skłodowska-Curie Individual Fellowship
Funding agency: European Commission, H2020
Role: supervisor
Ref. 706538 - TranspvdW
Funding: 148 635.60 €
- 2014-2015** *Emergent quantum states in novel two-dimensional materials*
Funding agency: FCT, Portugal
Role: coordinator
Ref. EXPL/FIS-NAN/1728/2013
Funding: 38 388.00 €
- 2011-2013** *Models for graphene*
Funding agency: MICINN, Spain
Role: member
Ref. FIS2011-23713
- 2009-2011** *Electronic and structural properties of graphene and related materials*
Funding agency: MICINN, Spain
Role: member
Ref. FIS2008-00124

2009-2011 *Electronic properties of nanostructured graphene*

Funding agency: Calouste Gulbenkian Foundation, Portugal

Role: coordinator

Ref. Programa de Estímulo à Investigação 2008

Funding: 10 000.00 €

2007-2009 *Transport properties of graphene and related systems*

Funding agency: FCT, Portugal

Role: member

Ref. PTDC/FIS/64404/2006

Funding: 94 971.00 €

2.3 Teams

(3 Post-docs, 5 PhD students, 13 MSc students)

Post-doc**2016-18** BRUNO AMORIM (Marie Skłodowska-Curie fellow)**2015-16** LINHU LI (Joint post-doc position CSRC, Beijing and CeFEMA, IST, Lisbon)**2015-16** ZHENHUA WANG (Joint post-doc position CSRC, Beijing and CeFEMA, IST, Lisbon)**PhD****2023-...** RICARDO OLIVEIRA, “*Superconductivity in quasiperiodic moiré materials*”, in collaboration with Bruno Amorim (ongoing)**2023-...** JOÃO SILVA, “*Properties of topological matter lacking translational invariance*”, in collaboration with Miguel Araújo (ongoing)**2021-...** FLÁVIO ELIAS RICHE, “*Correlations in Quasi-periodic Structures*”, in collaboration with Pedro Ribeiro (ongoing)**2020-...** DANIEL BRITO, “*Topological insulators grown by molecular beam epitaxy (MBE) and related quantum devices*”, in collaboration with Sascha Sadewasser (ongoing)**2019-2023** MIGUEL GONÇALVES, “*Non-equilibrium control over quantum electronic matter*”, in collaboration with Pedro Ribeiro (accepted at Los Alamos and Princeton simultaneously, moved to Princeton after a short stay at Los Alamos)**2015-2020** HADI ZAHIR, “*Bilayers of 2D materials: spectral, transport, and entanglement properties*”, in collaboration with Pedro Ribeiro (moved to Bosch)**2015-2019** MUZZAMAL SHAUKAT, “*Dark solitons in Quantum Information Theory: Dark-soliton Qudits*”, in collaboration with Hugo Terças (moved to Instituto de Telecomunicações for a post-doc)

Master

- 2023**... HELENA DIAS, “*Non-linear Hall effect – From theory to experiment*”, in collaboration with André Pereira (ongoing)
- 2023** RAUL LIQUITO, “*Effects of quasi-disorder in higher-order topological insulators*”
- 2023** NICOLAU SOBROSA, “*Correlated phases in quasiperiodic twisted bilayer graphene*”, in collaboration with Pedro Ribeiro
- 2023** MAFALDA MOREIRA, “*Topological insulators: growth and characterization*”, in collaboration with André Pereira
- 2023** HUGO LÓIO, “*Effects of disorder in higher-order topological insulators*”, in collaboration with Pedro Ribeiro
- 2022** RICARDO OLIVEIRA, “*Superconductivity in quasi-periodic twisted graphene bilayers*”, in collaboration with Bruno Amorim
- 2022** TIAGO GONÇALVES, “*Topology and quasi-periodicity in 2D electronic systems: application to twisted bilayer graphene*”, in collaboration with Pedro Ribeiro
- 2022** MIGUEL BOULTWOOD DE SÁ, “*Theoretical description of angle-resolved photoemission spectroscopy of low twist angle van der Waals multilayers*”, in collaboration with Bruno Amorim
- 2021** JOÃO SILVA, “*Topology and disorder in nodal loop semimetals*”, in collaboration with Miguel Araújo
- 2018** FRANCISCO BRITO, “*Development of a QMC code to tackle interacting electronic systems in 2D with application to TMD nanoribbons*”, in collaboration with João Lopes
- 2018** MIGUEL GONÇALVES, “*Phase diagram of the Haldane-Falicov-Kimball model*”, in collaboration with Pedro Ribeiro (IST Award for the best thesis in Condensed Matter and Nanotechnology 2018)
- 2017** GONÇALO CATARINA, “*Twisted bilayer graphene — electronic and optical properties*”, in collaboration with Nuno Peres
- 2016** FREDERICO SOUSA, “*Dilute magnetism in graphene*”
- 2015** JOÃO BRAZ, “*Electronic Properties of Single-layered Transition Metal Dichalcogenides*”

Undergraduate

- 2023** JOÃO CARDOSO, “Propriedades eletrônicas da tetra-camada de grafeno com empilhamento ABCA”
- 2022** RAUL LIQUITO, “Quase-Desordem e Topologia em sistemas com Pontos de cruzamento quadráticos em bandas”
- 2022** NICOLAU SOBROSA, “Efeito das interações eletrônicas nas fases de isolante de Anderson topológico em sistemas com pontos de cruzamento de bandas quadrático no limite limpo”
- 2022** ANDRÉ SOARES, “Desordem quiral e estados de fronteira em grafeno: uma perspectiva topológica”
- 2021** FRANCISCA QUEIRÓS, “Efeitos de desordem e quase-desordem em transições de fase de sistemas eletrônicos 1D”
- 2021** NICOLAU SOBROSA, “Pontos de cruzamento de bandas sob o efeito de interações eletrônicas e desordem”
- 2021** RICARDO OLIVEIRA, “Efeito das correlações eletrônicas na proximidade de defeitos topológicos no grafeno”
- 2021** TIAGO GONÇALVES, “Efeitos de desordem e quase-desordem em fases topológicas de sistemas bidimensionais”
- 2020** JOÃO SILVA, “Efeitos de desordem em anéis nodais”
- 2020** RICARDO OLIVEIRA & TIAGO GONÇALVES, “Kirigami e quebra espontânea de simetria na rede do grafeno”
- 2019** JOÃO SILVA, “Models for electronic topological systems”
- 2017** FRANCISCO VAZÃO, “Model for a Quantum Hall Effect without an external Magnetic Field”, in collaboration with Pedro Ribeiro
1st year student in Physics (BSc) presenting a poster at the 59th LIYSF - London International Youth Science Forum; poster in top 10 out of 100, selected for an individual presentation to 500 participants of 67 countries

2.4 Recognition

Scientific journals referee

46 verified reviews (Web of Science): APS, IOP, IEEE, Elsevier journals, and journals from the publishers of Nature.

Projects referee

2022 NRDI Office (Hungary), 2021 DOE (USA), 2020 FONDECYT (Chile), 2019 DFG (Germany), 2017 NWO (Netherlands)

Scientific Committees

- 2022** FÍSICA 2022 – 23^a Conferência Nacional de Física and 31^o Encontro Ibérico para o Ensino da Física, Faculdade de Ciências da Universidade do Porto, Porto, Portugal, 7-10 September
<https://fisica2022.sci-meet.net/>
- 2022** 3rd Condensed Matter Physics National Conference, Faculdade de Ciências da Universidade de Lisboa, Lisboa, Portugal, 28 February - 2 March
<https://cmpnc2021.sci-meet.net/>

Positions

- 2021 to present** Member of the Associated Lab *Laboratory of Physics for Materials and Emergent Technologies* (LaPMET), Portugal.
- 2019 to present** Permanent member of Physics Center of Minho and Porto Universities (CF-UM-UP), FCUP, Porto, Portugal.
- 2012 to present** Associate member at CSRC - Computational Science Research Center, Bijing, China.
- 2015-2018** Permanent member of Center of Physics and Engineering of Advanced Materials (CeFEMA), Instituto Superior Técnico, University of Lisbon, Lisboa, Portugal.
- 2012-2014** Permanent member of Center for Physics of Fundamental Interactions (CFIF), Instituto Superior Técnico, University of Lisbon, Lisboa, Portugal.
- 2009-2012** Post-doctoral researcher, Group of Theory and Simulation of Materials at the Madrid Institute for Material Science (ICMM-CSIC), Madrid, Spain.
- 2008** Visitor post-doctoral researcher, Division Condensed Matter, Max Planck Institute for the Physics of Complex Systems (MPI-PKS), Dresden, Germany.
- 2005** Visitor PhD student researcher, Condensed Matter Theory Group, Physics Department, Boston University, Boston, USA.
- 2004-2008** PhD student researcher, Theoretical Physics Center at University of Porto (CFP) and Physics Department of the Faculty of Sciences of University of Porto, Porto, Portugal.
- 2002-2003** Graduated student researcher, Theoretical Physics Center at University of Porto (CFP) and Physics Department of the Faculty of Sciences of University of Porto, Porto, Portugal.

Invited Talks

- 2023** *(invited) The role of quasiperiodicity in moiré electron systems*
Workshop on Criticality, Dynamics, and Nonequilibrium Behavior in Quantum Systems, Évora, Portugal, 2-6 October
https://www.cdnbqs.uevora.pt/Web-2023/webpage/program_speakers.php
- 2022** *(invited) 2D Transition Metal Dichalcogenides: a playground for interaction effects*
José Carmelo-Fest, University of Minho, Braga, 8-9 July
<https://www.fc.up.pt/carmelo-fest/program/>
- 2021** *(invited) Twisted bilayer graphene as a quasi-disordered system*
Vitor's Conference on Condensed and Other Matters, Online, 13-14 September
<https://sites.google.com/tecnico.ulisboa.pt/vitors-conference/schedule?authuser=0>
- 2019** *(invited) Topological matter in 2D: effects of disorder and interactions*
Condensed Matter Physics National Conference, University of Porto, Porto, Portugal, 8-10 May
- 2019** *(invited) Topology, disorder, and interactions in 2D matter*
International Conference on Surfaces, Coatings and Nanostructured Materials (NANOSMAT-Mediterranean), Session: 2D Materials, Mohamed V University, Rabat, Morocco, 2-4 May
- 2018** *(invited) Topological matter under strain*
Workshop on Field Theory and Condensed Matter Physics, University of Minho, Braga, Portugal, 19-20 April
- 2016** *(invited) Possible spin polarized ground state in graphene and transition metal dichalcogenides*
Recent Progress in Spintronics of 2D Materials, Hsinchu, Taiwan, 13-16 November
- 2016** *(invited) Graphene and other 2D materials, and why we should care*
C2TN Workshop on Advanced Materials, IST-CTN, Lisbon, Portugal, 10 November
- 2016** *(invited) Absence of Anderson localization in class-A Dirac systems: a lattice perspective*
Conference on interactions and topology in Dirac systems, ICTP, Trieste, Italy, 3-9 August
- 2016** *(invited) Phases with non-trivial topology in graphene and transition metal dichalcogenides*
nanoPT 2016 - Nanoscience and Nanotechnology International Conference, INL, Braga, Portugal, 16-19 February
- 2015** *(invited) Graphene and beyond: electronic properties of novel 2D materials*
SMIB-2015 Semiconductors Meet Ion Beams, Workshop in the frame of the projects GreenLight and Nanowires, IST-CTN, Lisbon, Portugal, 25-26 June

- 2014** (invited) *Graphene: a paradigm in fundamental and applied physics*
FÍSICA 2014 – 19ª Conferência Nacional de Física and 24º Encontro Ibérico para o Ensino da Física, Instituto Superior Técnico, Lisbon, Portugal, 2-4 September
- 2013** (invited) *Silicene and MoS₂: 2D electronic physics beyond graphene*
Workshop on Graphene and other 2D materials: A roadmap for Portugal, Braga, Portugal, 18 June
- 2010** (invited) *Electron – acoustic phonon scattering in graphene*
III Workshop on Modern Trends in Field Theory, Centro de Física do Porto, Porto, Portugal, 21-23 October
- 2008** (invited) *Bilayer graphene: gap tunability and edge properties*
International Conference on Theoretical Physics “Dubna-Nano2008”, Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna, Moscow Region, Russia, 7-11 July

Participation in Jury Panels

PhD

- 2024** PhD thesis defense of Bruno Murta, entitled “Quantum many-body ground states via digital quantum simulation”, Universidade do Minho, Portugal, 29 February 2024.
- 2023** Pre-examiner (issuance of review report) of the doctoral thesis of Maryam Khosravian, entitled “Designing artificial moire van der Waals topological superconductivity”, Aalto University (SCI), 8 November 2023.
- 2023** PhD thesis defense of Marwa Mannai, entitled “Two dimensional topological models: role of strain, disorder, stacking and twist”, Université Tunis El Manar, Tunisia, 3 February 2023.
- 2021** PhD thesis defense of Noel Alberto García Martínez, entitled “Functionalized Bilayer Graphene For Quantum Technologies”, Universidad de Alicante, Spain, 28 September.
- 2020** (*supervisor*) PhD thesis defense of Hadi Zahir Olyaei, entitled “Quantum Transport in Hybrid Monolayer-Bilayer Graphene Structures”, Universidade de Lisboa, Instituto Superior Técnico, Portugal, 31 July.
- 2020** PhD thesis defense of Syed Tahir Amin, entitled “Tracking topological phase transitions using information geometric quantities”, Universidade de Lisboa, Instituto Superior Técnico, Portugal, 28 February.
- 2019** PhD thesis defense of Vicente Arjona Romano, entitled “Novel thermoelectric and elastic responses in dirac matter”, Universidad Autónoma de Madrid, Spain, 13 December.

- 2018** PhD thesis defense of André Jorge Carvalho Chaves, entitled “Photonics of graphene and other two-dimensional materials heterostructures”, Universidade do Minho, Portugal, 4 July.
- 2018** PhD thesis defense of Luis A. González Árraga, entitled “Modelling spin correlations in graphene and chiral molecules”, Universidad Autónoma de Madrid, Spain, 11 May.
- 2017** PhD thesis defense of José Daniel Lago da Silva Neves Gouveia, entitled “Magnetic properties of quantum electronic systems with non-trivial geometries”, Universidade de Aveiro, Portugal, 24 March.
- 2016** PhD thesis defense of Yago Ferreiros Bas, entitled “Emergent Gauge Fields and Topological Effects in Dirac Matter”, Universidad Autónoma de Madrid, Spain, 16 September.
- 2013** PhD thesis defense of João Nuno Barbosa Rodrigues, entitled “Extended Stone-Wales defects in graphene”, Universidade do Porto, Portugal, 11 April.
- 2013** PhD thesis defense of Adolfo González Grushin, entitled “Topology and interaction effects in Dirac quasiparticle systems”, Universidad Autónoma de Madrid, Spain, 15 February.

Master

- 2023** (*supervisor*) Raul Miguel da Silva Liquito, “Incommensurability effects on a Second Order Topological Insulator”, Faculdade de Ciências da Universidade do Porto, Portugal, December
- 2023** (*supervisor*) Nicolau Fernando Ferreira Sobrosa, “Correlated Phases on Quasi-Periodic 1D Moiré systems”, Faculdade de Ciências da Universidade do Porto, Portugal, December
- 2022** Maria Francisca Galego Fonseca de Alvarez Madeira, “Quasi-Disorder Effects in Topological Superconductors”, Universidade de Lisboa, Portugal, May
- 2021** Rafael Carreira de Jesus Torres, “Phase Diagram of the 4D U(1) Lattice Pure Gauge Theory”, Universidade de Lisboa, Portugal, September
- 2021** Maria del Carmen Gallardo González, “Nanoestruturas bidimensionais de MoSe₂: de triângulos a fratais”, Universidade de Lisboa, Portugal, July
- 2018** (*supervisor*) Francisco Monteiro de Oliveira Brito, “Development of a QMC code to tackle interacting electronic systems in 2D with application to TMD nanoribbons”, Universidade de Lisboa, Portugal, November
- 2017** Miguel Moreira de Oliveira, “Liquid and Ordered Phases of Geometrical Frustrated Charges: A Monte Carlo study of the Falicov-Kimball model on the triangular lattice”, Universidade de Lisboa, Portugal, November

- 2017** (*supervisor*) Gonalo Filipe Santos Catarina, “Twisted bilayer graphene – electronic and optical properties”, Universidade de Lisboa, Portugal, March
- 2016** (*supervisor*) Frederico Joo Ferreira de Sousa, “Dilute magnetism in graphene”, Universidade de Lisboa, Portugal, November
- 2016** Carolina de Almeida Marques, “Growth and characterization of low dimensional Mo Selenide”, Universidade de Lisboa, Portugal, November
- 2015** Filipe Daniel Rodrigues Santos, “Critical magnetic fields in superconducting system with semimetallic bands”, Universidade de Aveiro, Portugal, December
- 2015** (*supervisor*) Joo Eduardo Henriques Braz, “Electronic Properties of Single-layered Transition Metal Dichalcogenides”, MEFT, Universidade de Lisboa, Portugal, November
- 2014** Ana Cristina Oliveira Silva, “The effect of Majorana fermions on the Andreev spectroscopy applied to topological multiband superconductors”, MEFT, Universidade de Lisboa, Portugal, October
- 2014** Natalia Leito Marques Morais, “Electronic Structure of Heterogeneous Materials: Application to optical properties”, MEFT, Universidade de Lisboa, Portugal, October

Bachelor

- 2022** Andr Marinho, “Simulation of angle-resolved photoemission spectroscopy in disordered systems”, Bachelor Degree in Physics, Universidade do Minho, Portugal, July

Awards and Fellowships

Awards

1. IST Outstanding Teaching Award (2017/2018 academic year), 2019
The award distinguishes each academic year the best teachers according to a blind survey to students.
2. Seeds of Science 2011 – Exact Sciences, “Cincia Hoje” journal, 2011
The award distinguishes each year personalities with outstanding contributions to the production of scientific knowledge.
3. Fernando Bragana Gil award, Portuguese Physical Society, 2010.
For the PhD thesis presented to any Portuguese University (between 1/1/2007 and 31/12/2008) that makes the most substantial contribution to the progress of physics.
4. Programa de Estmulo  Investigao, Calouste Gulbenkian Foundation, 2008.
The program distinguishes each year research proposals with high creative potential in basic sciences.

5. Eng. António de Almeida award by Eng. António de Almeida Foundation, 2002.
Highest mark in the Faculty of Sciences of the University of Porto, 2001.
6. Prof. Moreira de Araújo award by Faculty of Sciences of the University of Porto, 2002.
Highest mark in Physics at the Faculty of Sciences of the University of Porto, 2001.

Fellowships

- 02/2009-01/2012** Post-doctoral fellowship by the Spanish Ministry of Science and Innovation under the “Juan de la Cierva” program, Spain.
- 10/2008-11/2008** Post-doctoral at Max Planck Institute for the Physics of Complex Systems (visitors program), Dresden, Germany.
- 03/2008-08/2008** Fellowship for scientific research, Theoretical Physics Center at University of Porto (Centro de Física do Porto), Portugal.
- 01/2004-12/2007** Fellowship for Doctoral Degree, Foundation for Science and Technology, Portugal.
- 02/2002-08/2002** Fellowship for scientific research, Theoretical Physics Center at University of Porto (Centro de Física do Porto), Portugal.

Scientific visits abroad

Short term visits

- 2019** Invited researcher at Physics Department, Faculty of Sciences, University of Tunis El Manar, Tunes, Tunisia, 3-7 September.
- 2018** Visitor researcher at ICMM – CSIC, Madrid, Spain, 17-18 December.
- 2018** Visitor researcher at ICMM – CSIC, Madrid, Spain, 8-11 May.
- 2016** Visitor researcher at ICMM – CSIC, Madrid, Spain, 15-16 September.
- 2015** Visitor researcher at ICMM – CSIC, Madrid, Spain, 26-29 October.
- 2015** Invited researcher at Institute for Theoretical Physics, University of Regensburg, Regensburg, Germany, 17-19 June.
- 2014** Visitor researcher at ICMM – CSIC, Madrid, Spain, 9-14 June.
- 2013** Visitor researcher at ICMM – CSIC, Madrid, Spain, 9-15 June.
- 2012** Visitor researcher at ICMM – CSIC, Madrid, Spain, 24-27 April.
- 2010** Invited researcher at Department of Physics, Budapest University of Technology and Economics, Budapest, Hungary, 24-29 May.

Medium term visits

- 2019** Computational Science Research Center, Beijing, China, 10 July to 8 August.
- 2018** Computational Science Research Center, Beijing, China, 10 July to 8 August.
- 2017** Computational Science Research Center, Beijing, China, 8 July to 9 August.
- 2016** Computational Science Research Center, Beijing, China, 3 July to 3 August.
- 2015** Computational Science Research Center, Beijing, China, 4 July to 5 August.
- 2014** Computational Science Research Center, Beijing, China, 5-27 July.
- 2013** Computational Science Research Center, Beijing, China, 3-25 July.
- 2012** Computational Science Research Center, Beijing, China, 5-28 July.
- 2010** Condensed Matter Theory Group, Physics Department, Boston University, Boston, USA, April and May.
- 2008** Division Condensed Matter, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, October and November.
- 2005** Condensed Matter Theory Group, Physics Department, Boston University, Boston, USA, April to June.

3 Pedagogical curriculum

3.1 Teaching activity

2018 to present Assistant professor, Department of Physics and Astronomy, Faculty of Sciences of the University of Porto, Portugal.

Curricular Units (CU) taught are listed below, with an indication of the number of students in parenthesis, academic year, and type of CU (theory-T, practice-TP, practice in Lab-PL). The CUs were mainly taught to BSc in Physics and BSc in Engineering Physics students at FCUP. Also indicated is the the Students Assessment of the CU Quality (IPUP - Inquéritos Pedagógicos da Universidade do Porto) where the minimum value is 1 and the maximum is 7.

Waves and Continuum Media (...) 2023-24 T+TP // IPUP - ___

Quantum Mechanics II (...) 2022-23 T+TP // IPUP -

Condensed Matter Physics (...) 2022-23 TP // IPUP -

Electromagnetism I (...) 2022-23 TP // IPUP -

Waves and Continuum Media (163) 2022-23 T+TP // IPUP -

Quantum Mechanics II (34) 2021-22 T+TP // IPUP - 7

Condensed Matter Physics (114) 2021-22 TP // IPUP - 6.4

Waves and Continuum Media (173) 2021-22 T+TP // IPUP - 7
Waves and Continuum Media (144) 2020-21 T+TP // IPUP - 7
Statistical Physics (148) 2020-21 TP // IPUP - 6.8
Quantum Mechanics II (37) 2019-20 T+TP // IPUP - 6.8
Modern Physics (143) 2019-20 T // IPUP - 6.8
Condensed Matter Physics (97) 2019-20 TP // IPUP - 6.8
Waves and Continuum Media (134) 2019-20 TP // IPUP - 6.9
Statistical Physics (113) 2019-20 TP // IPUP - 6.3
Quantum Mechanics II (31) 2018-19 T+TP // IPUP - 6.8
Modern Physics (125) 2018-19 T+TP // IPUP - 6.8
Mechanics (159) 2018-19 TP // IPUP - 6.8
Communication in Science (129) 2018-19 PL // IPUP - 6.8
Quantum Mechanics II (18) 2017-18, T+TP // IPUP - 5.5
Modern Physics (95) 2017-18, T+TP // IPUP - 6.8

Responsible for following doctoral CU (2018-19, 2019-20, 2020-21, 2021-22, and 2022-2023):

Introduction to Topological Matter Joint Doctoral program in Physics, Universities of Minho, Aveiro and Porto (MAP-Fis)

2012-2017 Assistant professor at Instituto Superior Técnico, University of Lisbon, Lisboa, Portugal.

Curricular Units (CU) taught are listed below. Indication of academic year, type of CU (theory, problems / practice, laboratory), and the respective Bachelor or Master degree is provided. Also indicated is the the Students Assessment of the CU Quality (QUC – Qualidade das Unidades Curriculares por inquérito pedagógico aos alunos) where the minimum value is 1 and the maximum is 9.

Electromagnetism and Optics 2017-18, Theory – 2nd year Master in Electrotechnics Engineering and Computers at Técnico (MEEC) // QUC - 9

Solid State Physics 2016-17, Theory – 3rd year Master's program in Engineering Physics at Técnico (MEFT) // QUC - 8.25

Solid State Physics 2016-17, Problems – 3rd year Master's program in Engineering Physics at Técnico (MEFT) // QUC - 8.25

General Mechanics 2016-17, Theory – 1st year Master's program in Engineering Physics at Técnico (MEFT) // QUC - 7.5

General Mechanics 2016-17, Problems – 1st year Master's program in Engineering Physics at Técnico (MEFT) // QUC - 7.38

Solid State Physics 2015-16, Theory – 3rd year Master's program in Engineering Physics at Técnico (MEFT) // QUC - 7.25

- Solid State Physics** 2015-16, Problems – 3rd year Master’s program in Engineering Physics at Técnico (MEFT) // QUC - 6.75
- General Mechanics** 2015-16, Theory – 1st year Master’s program in Engineering Physics at Técnico (MEFT) // QUC - 8.38
- General Mechanics** 2015-16, Problems – 1st year Master’s program in Engineering Physics at Técnico (MEFT) // QUC - 8.12
- Solid State Physics** 2014-15, Theory – 3rd year Master’s program in Engineering Physics at Técnico (MEFT) // QUC - 6.88
- Solid State Physics** 2014-15, Problems – 3rd year Master’s program in Engineering Physics at Técnico (MEFT) // QUC - 6.62
- General Mechanics** 2014-15, Theory – 1st year Master’s program in Engineering Physics at Técnico (MEFT) // QUC - 6.81
- General Mechanics** 2014-15, Problems – 1st year Master’s program in Engineering Physics at Técnico (MEFT) // QUC - 7.12
- Solid State Physics** 2013-14, Theory – 3rd year Master’s program in Engineering Physics at Técnico (MEFT) // QUC - 6.88
- Solid State Physics** 2013-14, Problems – 3rd year Master’s program in Engineering Physics at Técnico (MEFT) // QUC - 7.25
- General Mechanics** 2013-14, Theory – 1st year Master’s program in Engineering Physics at Técnico (MEFT) // QUC - 6.50
- General Mechanics** 2013-14, Problems – 1st year Master’s program in Engineering Physics at Técnico (MEFT) // QUC - 6.44
- Mechanics and Waves** 2013-14, Theory – 2nd year BSc in Informatics and Computer Engineering (LEIC-T) // QUC - 8.88
- Mechanics and Waves** 2013-14, Problems – 2nd year BSc in Informatics and Computer Engineering (LEIC-T) // QUC - 8.88
- Thermodynamics and the Structure of Matter** 2013-14, Problems – 2nd year Master’s program in Engineering Physics at Técnico (MEFT), Master’s program in Biomedical Engineering, and BSc in Applied Mathematics and Computers // QUC - 7.88
- General Mechanics** 2012-13, Theory – 1st year Master’s program in Engineering Physics at Técnico (MEFT) // QUC - 8.12
- General Mechanics** 2012-13, Problems – 1st year Master’s program in Engineering Physics at Técnico (MEFT) // QUC - 7.88
- Thermodynamics and the Structure of Matter** 2012-13, Laboratory – 2nd year Master’s program in Engineering Physics at Técnico (MEFT), Master’s program in Biomedical Engineering, and BSc in Applied Mathematics and Computers // QUC - 7.06
- Thermodynamics and the Structure of Matter** 2012-13, Problems – 2nd year Master’s program in Engineering Physics at Técnico (MEFT), Master’s program in Biomedical Engineering, and BSc in Applied Mathematics and Computers // QUC - 6.75

Mechanics and Waves 2011-12, Problems – 2nd year BSc in Informatics and Computer Engineering (LEIC-A) // QUC - 7.50

Responsible for following master and doctoral CUs (2017-18):

Topics in Condensed Matter Physics Master in Engineering Physics at Técnico

Advanced Topics in Condensed Matter Physics Doctoral program in Physics and Engineering Physics at Técnico

2007 Invited high school teacher (Electrotechnics for theater and cinema technicians, grades 10-12), Academia Contemporânea do Espectáculo, Porto, Portugal.

(in Portuguese) Professor de Electrotecnia na Academia Contemporânea do Espectáculo - escola profissional de artes e do espectáculo, anos 2 e 3 do curso de Luz, Som e Efeitos Cénicos (equivalência 11º e 12º anos de escolaridade).

2002-2004 Teaching assistant, Physics Department, Faculty of Sciences of the University of Porto, Portugal.

(in Portuguese) Monitor do Departamento de Física da Faculdade de Ciências da Universidade do Porto

Computational Physics 2003-04, Problems / Practice – 3rd year BSc in Physics, Applied Physics, Physics and Technology of Materials, Optoelectronics and Lasers, Computer Science

(in Portuguese) Física Computacional do 3º ano das Licenciaturas em Física (ramo científico), Física Aplicada, Física e Tecnologia dos Materiais, Optoelectrónica e Lasers, e Ciência de Computadores (ramo científico)

Physics Lab 2 2003-04, Laboratory – 1st year BSc in Chemistry

(in Portuguese) Laboratório de Física 2 do 1º ano das Licenciaturas em Química e Ensino da Física e Química

Mechanics of Solids 2003-04, Practice / Lab – 2nd year BSc in Metallurgy Engineering

(in Portuguese) Mecânica dos Sólidos do 2º ano da Licenciatura em Engenharia Metalúrgica

Physics Lab 1 2003-04, Laboratory – 1st year BSc in Chemistry

(in Portuguese) Laboratório de Física 1 do 1º ano da Licenciatura em Química

General Physics 1 2003-04, Problems – 1st year BSc in Metallurgy Engineering

(in Portuguese) Física Geral 1 (prática) do 1º ano da Licenciatura em Engenharia Metalúrgica

Physics Lab 2 2002-03, Laboratory – 1st year BSc in Physics and Applied Mathematics (Astronomy)

(in Portuguese) Laboratório de Física 2 do 1º ano das Licenciaturas em Física e Matemática Aplicada (Astronomia)

Introduction to Computational Physics 2002-03, Problems / Practice – 2nd year BSc in Physics and Chemistry Teachers

(in Portuguese) Introdução à Computação em Física do 2º ano da Licenciatura em Ensino da Física e Química

Mechanics of Solids 2002-03, Practice / Lab – 2nd year BSc in Metallurgy Engineering

(in Portuguese) Mecânica dos Sólidos do 2º ano da Licenciatura em Engenharia Metalúrgica

Physics Lab 1 2002-03, Laboratory – 1st year BSc in Physics

(in Portuguese) Laboratório de Física 1 do 1º ano das Licenciaturas em Física e Ensino da Física e Química

3.2 Pedagogical projects

(PhD) Introduction to Topological Matter @ MAP-Fis New curricular unit (CU) proposed for the Joint Doctoral program in Physics at Universities of Minho, Aveiro and Porto (MAP-Fis). The CU started in 2018 and has attracted students every year since then.

(MSc) Master in Physics @ FCUP Redefinition of the structure of this cycle of studies (CS) within the scope of the 2021 Assessment of Study Cycles by A3ES. The project had as its main objective to increase the attractiveness of the CS, to propose greater flexibility in the choice of optional curricular units, and to reinforce their offer. The A3ES Board of Directors accredited the Master in Physics for another 6 years in 05/18/2022.

(BSc) Waves and Continuous Media @ FCUP Definition and implementation an improved program, new teaching methodology, and new bibliography, 2020.

(BSc) Quantum Mechanics II @ FCUP Definition and implementation an improved program, new teaching methodology, and new bibliography, 2019.

(BSc) Modern Physics @ FCUP Definition and implementation an improved program and new bibliography, 2019.

(BSc) Solid State Physics @ IST Definition and implementation an improved program, new teaching methodology, and new bibliography, 2014.

(BSc) General Mechanics @ IST Definition and implementation an improved program, new teaching methodology, and new bibliography, 2013.

3.3 Pedagogical material

Summer School like courses, taught to BSc/MSc or MSc/PhD students:

- *Introduction to the theory of Localization* (MSc/PhD)
“Quantum Matter Summer School 2022”, Quantum Matter - Materials and Concepts summer training program, IPT, Tomar, Portugal, 2022 edition. Material available here (with Miguel Gonçalves and Lucas Sá), in particular theory notes and hands-on session.

- *2D Materials* (BSc/MSc)
“Toddler’s School on Quantum Matter”, Online, Quantum.Matter@PT network, 2021 and 2022 editions. Material for the 2022 edition available here (with Bruno Amorim).
- *Topological Quantum Matter with Examples* (MSc/PhD)
“Quantum Matter Summer School 2021”, Quantum Matter - Materials and Concepts summer training program, IPB-ESTG, Portugal, 2021 edition. Material available here (with Miguel Gonçalves).

Curricular Units taught to BSc students (in portuguese):

- Waves and Continuum Media – theory notes (130 pages), available here; 30 exam problems (2019-2022, with Manuel Moreira in 2019-2020 and with Fátima Mota in 2020-2021), available here.
- Quantum Mechanics II – 52 exam problems (2018-2022), available here.
- Modern Physics – 70 exam problems (2018-2020, with Fátima Mota), available here.
- Solid State Physics – 65 exam problems, available here. 16 homework sheets, available here.
- General Mechanics – 72 exam exercises, available here. 30 adapted homework problems, available here.
- Thermodynamics and Structure of Matter – 38 detailed solutions for exercises in *Fundamentals of Statistical and Thermal Physics* (Frederick Reif), available here.

4 Other relevant activities

4.1 Dissemination of knowledge and Outreach activities

Organization of Workshops and Schools

- 2023** “Quantum Matter Summer School 2023”, Quantum Matter - Materials and Concepts summer training program, University of Aveiro, Aveiro, Portugal, 3-7 July
<https://sites.google.com/view/qm-ss-2023>
- 2023** “A view from the Dirac cone”, Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC), Madrid, Spain, 24-25 April
<https://wp.icmm.csic.es/gelifest/>
- 2022** “Quantum Matter Summer School 2022”, Quantum Matter - Materials and Concepts summer training program, IPT, Tomar, Portugal, 3-7 September
<https://sites.google.com/view/qm-ss2022>

- 2021** “Quantum Matter Summer School 2021”, Quantum Matter - Materials and Concepts summer training program, IPB-ESTG, Bragança, Portugal, 15-18 September
<https://sites.google.com/view/qm-ss-2021>
- 2020** “Quantum Matter Summer School 2020”, Quantum Matter - Materials and Concepts summer training program, Caramulo, Portugal, 31 August - 04 September
<https://quantummatterpt.weebly.com/school-edition-2020.html>
- 2019** Workshop on Ordering and Dynamics of Correlated Quantum Systems, Évora, Portugal, 21-25 October.
<http://www.odcqs.uevora.pt/index.php>
- 2019** KITE Workshop, Departement of Physics and Astronomy, FCUP, Porto, Portugal, 14-15 January.
<https://www.fc.up.pt/kiteworkshop/>
- 2017** Mini-Workshop on Theoretical Condensed Matter Physics, Instituto Superior Técnico, Lisbon, Portugal, 27 February.
- 2016** 1st CeFEMA Workshop on Graphene and other 2D Materials, Instituto Superior Técnico, Lisbon, Portugal, 5 December.
- 2015** Mini-Workshop on Theoretical Condensed Matter Physics, Instituto Superior Técnico, Lisbon, Portugal, 12 November.
- 2010** Mathematica Summer School on Theoretical Physics (2nd edition) – Condensed Matter and Two-Dimensional Physics, Departement of Physics and Astronomy, FCUP, Porto, Portugal, 11-16 July.
<http://msstp.org/?q=node/16>
- 2009** 1st CFP Workshop on Graphene - CFPWG09, Theoretical Physics Center at University of Porto (CFP), Porto, Portugal, 30-31 October.

Organization of Seminars and Colloquia

- 2020-to-present** “Quantum Agora” - A weekly mix of informal discussion sessions, short courses and journal club, transmitted over zoom - Quantum.Matter@PT network
<https://quantummatterpt.weebly.com/qmagora.html>
- 2020-to-present** “Quantum Matter Colloquium” - Series of talks by outstanding scientists (monthly) - Quantum.Matter@PT network
<https://quantummatterpt.weebly.com/qmcolloquium.html>
- 2015–17** “Cicle of CeFEMA seminars” (in collaboration with Diogo Santos)
 Monthly general seminar of CeFEMA, intended to be of interest for both Physics and Engineering of Advanced Materials sections
- 2014** “Condensed Matter Seminar”
 Monthly general seminar for the scientific area of Condensed Matter and Nanotechnology of the Physics Department at Instituto Superior Técnico

Presentations

Presentations at scientific meetings: 39 talks and 11 posters – see Appendix C for a complete list

Seminars, Lectures, and Outreach: 20 scientific seminars (several abroad), 18 lectures (several abroad), 19 outreach talks (including for the general public and for medium to high school students) – see Appendix D for a complete list

Publications

(in portuguese)

2017 *O que há de topológico na matéria que nos rodeia? Trocando por miúdos o Nobel da Física de 2016*

Eduardo V. Castro and Pedro Ribeiro
Gazeta de Física **40**, 2 (2017)

2017 *Notícias da terra-plana*

Eduardo V. Castro
PULSAR **38**, 6 (2017)

4.2 University management

Education related management

05/2022-to-present Member of the Restricted Scientific Commission of the Physics and Astronomy Department at Faculty of Sciences of the University of Porto

04/2021-12/2022 Deputy head (sub-Diretor) of the Physics and Astronomy Department at Faculty of Sciences of the University of Porto

04/2021-12/2022 Coordinator for Institutional Communication and Image of the Physics and Astronomy Department at Faculty of Sciences of the University of Porto

04/2021-12/2022 Member of the Executive Commission of the Physics and Astronomy Department at Faculty of Sciences of the University of Porto

2019-to-present Director of Master programme – Physics Master degree at Faculty of Sciences of the University of Porto (Mestrado em Física)

2019-to-present Chairman of the Scientific Committee – Physics Master degree at Faculty of Sciences of the University of Porto (Mestrado em Física)

2019-to-present Chairman of the Program Follow-up Committee – Physics Master degree at Faculty of Sciences of the University of Porto (Mestrado em Física)

2019-2021 Member of the Scientific Committee – Physics BSc degree at Faculty of Sciences of the University of Porto (Licenciatura em Física)

Scientific management

- 2020-to-present** Director of the Physics Research Center at U. Porto (Centro de Física do Porto - CFP) — University of Porto pole of CF-UM-UP
- 2015–17** Responsible Investigator for the “Structuring project GOLDmater – Graphene and Other Low Dimensional materials” at CeFEMA (Center for the Physics and Engineering of Advanced Materials, IST)
- 2013-14** Member of the Management Committee for the research center CFIF (Center for the Physics of Fundamental Interactions, IST)

4.3 Participation in Workshops, Conferences, and Schools

Career development

- 2022** Training action “Exercícios Temporizados - Utilização e Configuração”, Porto, FCUP, 26 January
- 2020** Webinar "Introdução ao ambiente Moodle U.Porto", Porto, FCUP, 10 February
- 2015** PAX-IST Shaping the future – “Engineering and Science Faculty: Developing your career”, Lisbon, IST, 9-11 September

Scientific

- 2023** Workshop on Criticality, Dynamics, and Nonequilibrium Behavior in Quantum Systems, Évora, Portugal, 2-6 October
- 2023** "Stories in the flatland (with a twist in the end)" symposium in honour of Prof. Francisco Guinea, Instituto IMDEA Nanociencia, Madrid, Spain, 22-23 June
<https://www.nanociencia.imdea.org/home-en/events/item/pacofest>
- 2023** “A view from the Dirac cone”, Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC), Madrid, Spain, 24-25 April
<https://wp.icmm.csic.es/gelifest/>
- 2022** 3rd Condensed Matter Physics National Conference, Faculdade de Ciências da Universidade de Lisboa, Lisboa, Portugal, 28 February - 2 March
- 2021** American Physical Society March-Meeting, Online, 21-25 March
- 2019** Workshop on Ordering and Dynamics of Correlated Quantum Systems, Évora, Portugal, 21-25 October
- 2019** Condensed Matter Physics National Conference, University of Porto, Porto, Portugal, 8-10 May

- 2019** International Conference on Surfaces, Coatings and Nanostructured Materials (NANOSMAT-Mediterranean), Session: 2D Materials, Mohamed V University, Rabat, Morocco, 2-4 May
- 2019** KITE Workshop, Departement of Physics and Astronomy, FCUP, Porto, Portugal, 14-15 January
- 2018** Workshop on Field Theory and Condensed Matter Physics, University of Minho, Braga, Portugal, 19-20 April
- 2018** nanoPT 2018 - Nanoscience and Nanotechnology International Conference, Lisboa, Portugal, 7-9 February
- 2016** Recent Progress in Spintronics of 2D Materials, Hsinchu, Taiwan, 13-16 November
- 2016** C2TN Workshop on Advanced Materials, IST-CTN, Lisbon, Portugal, 10 November
- 2016** Workshop on Correlations, Integrability, and Criticality in Quantum Systems, Évora, Portugal, 24-28 October
- 2016** 26th General Conference of the Condensed Matter Division of the European Physical Society, Groningen, The Netherlands, 4-9 September
- 2016** Conference on interactions and topology in Dirac systems, ICTP, Trieste, Italy, 3-9 August
- 2016** nanoPT 2016 - Nanoscience and Nanotechnology International Conference, INL, Braga, Portugal, 16-19 February
- 2015** SMIB-2015 Semiconductors Meet Ion Beams, Workshop in the frame of the projects GreenLight and Nanowires, IST-CTN, Lisbon, Portugal, 25-26 June
- 2015** American Physical Society March-Meeting, San Antonio, Texas, USA, 2-6 March
- 2015** Mini-Workshop on Theoretical Condensed Matter Physics, Instituto Superior Técnico, Lisbon, Portugal, 6 January
- 2014** XXXVIII International Conference on Theoretical Physics: Correlations and coherence at different scales, Ustron, Poland, 5-10 September
- 2014** FÍSICA 2014 – 19^a Conferência Nacional de Física and 24^o Encontro Ibérico para o Ensino da Física, Instituto Superior Técnico, Lisbon, Portugal, 2-4 September
- 2013** Mini-Workshop on Theoretical Condensed Matter Physics, Instituto Superior Técnico, Lisbon, Portugal, 12 November
- 2013** Workshop on Graphene and other 2D materials: A roadmap for Portugal, Braga, Portugal, 18 June
- 2012** Workshop on Correlations and Coherence in Quantum Systems, Évora, Portugal, 8-12 October

- 2012** Gordon Research Conferences – Correlated Electron Systems: Correlations and Topology in Electron Systems, Mount Holyoke College, South Hadley MA , USA, June 24-29
- 2011** The new generation in strongly correlated electron systems – NGSCES 2111, Santiago de Compostela, Spain, 4-8 July
- 2011** ImagineNano, Bilbao, Spain, 11-14 April
- 2011** American Physical Society March-Meeting, Dallas, Texas, USA, 21-25 March
- 2010** School on New Materials: Graphene & Applications, Center of Physics and Mathematics, Rabat, Morocco, 06-11 December
- 2010** III Workshop on Modern Trends in Field Theory, Centro de Física do Porto, Porto, 21-23 October
- 2010** Trends in Nanotechnology International Conference (TNT2010), International Iberian Nanotechnology Center - INL, Braga, Portugal, 6-10 September
- 2010** 60th Meeting of Nobel Laureates in Lindau, Germany, June 27 - July 2
- 2010** E-MRS 2010 Spring Meeting, Strasbourg, France, 7-11 June
- 2010** ITN Nanoelectronics Meeting 2010 on “Nanoelectronics - Concepts, Theory and Modeling”, Jacobs University Bremen, Bremen, Germany, 17-21 May
- 2010** National Meeting of Condensed Matter Physics 2010, Instituto Superior Técnico, Lisbon, Portugal, 18-19 February
- 2009** GDR09 Meeting – Nanotube and Graphene Science and Applications, Coma-Ruga, Catalonia, Spain, 19-23 October
- 2009** 32nd International Symposium on Dynamical Properties of Solids (DyProSo XXXII), University of Antwerp, Antwerp, Belgium, 13-17 September
- 2009** Graphene Workshop in Benasque, Centro de Ciencias de Benasque Pedro Pascual, Benasque, Spain, July 25 - August 8
- 2009** Graphene Week 2009, Universitätszentrum Obergurgl, Ötz Valley, near Innsbruck, Austria, 2-7 March
- 2008** 22nd General Conference of the Condensed Matter Division of the European Physical Society, Rome, Italy, 25-29 August
- 2008** International Conference on Theoretical Physics “Dubna-Nano2008”, Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna, Moscow Region, Russia, 7-11 July
- 2008** American Physical Society March-Meeting, New Orleans, Louisiana, USA, 10-14 March

- 2008** 2nd Workshop on “Low-Dimensional Structures: Properties and Applications”, University of Aveiro, Aveiro, Portugal, January 31 - February 1
- 2007** International Symposium on Dynamical Properties of Solids (DyProSo XXXI), University of Porto, Porto, Portugal, 25-29 September
- 2007** Exotic States in Materials with Strongly Correlated Electrons (ESM’07 International Workshop), Sinaia, Romania, 7-10 September
- 2007** 4th NanoSpain Workshop, Seville, Spain, 12-15 March
- 2007** American Physical Society March-Meeting, Denver, Colorado, USA, 5-9 March
- 2006** Electron Correlations in Nano- and Macrosystems, Ustron, Poland, 9-14 September
- 2006** INSTANS Summer Conference, Villa Olmo, Como, Italy, 12-16 June
- 2006** American Physical Society March-Meeting, Baltimore, Maryland, USA, 13-17 March
- 2005** Física 2005 – Física para o séc. XXI, Porto, Portugal, 1-3 December
- 2005** Workshop on Complex Behaviour in Electronic Systems, University of Minho, Braga, Portugal, 15-16 September
- 2005** I²CAM Advanced Workshop on “Strongly Correlated Electrons: Diverse Examples and Unifying Themes”, Institut Scientifique de Cargèse, Corsica, France, 8-20 August
- 2005** The International Conference on Strongly Correlated Electron Systems, Vienna University of Technology – Institute of Solid State Physics, Vienna, Austria, 26-30 July
- 2003** Euroconference on Spin and Charge Transport in Nanostructures, University of Minho, Braga, Portugal, 1-5 September
- 2002** Condensed Matter Theory Summer School, University College of St. Martin’s, Ambleside, Cumbria, United Kingdom, 1-13 September
- 2001** Euroconference on Transport and Dynamics in Complex Electronic Materials, Faculty of Sciences of the University of Porto, Porto, Portugal, 3-7 September

A Articles

- 2024** *Third-order topological insulator induced by disorder*
Hugo Lóio, Miguel Gonçalves, Pedro Ribeiro, **Eduardo V. Castro**
Phys. Rev. B **109**, 014204 (2024)
<https://doi.org/10.1103/PhysRevB.109.014204>

- 2024** *Short-range interactions are irrelevant at the quasiperiodic-driven Luttinger Liquid to Anderson Glass transition*
Miguel Gonçalves, Jedediah H. Pixley, Bruno Amorim, **Eduardo V. Castro**, Pedro Ribeiro
Phys. Rev. B **109**, 014211 (2024)
<https://doi.org/10.1103/PhysRevB.109.014211>
- 2023** *Effects of dilution in a 2D topological magnon insulator*
Miguel S. Oliveira, T. V. C. Antão, **Eduardo V. Castro**, Nuno Peres
<https://arxiv.org/abs/2311.03457>
- 2023** *Fractal Quasicondensation in One Dimension*
Flavio Riche, Miguel Gonçalves, Bruno Amorim, **Eduardo V. Castro**, Pedro Ribeiro
<http://arxiv.org/abs/2310.10757>
- 2023** *Fate of Quadratic Band Crossing under quasiperiodic modulation*
Raul Liquito, Miguel Gonçalves, **Eduardo V. Castro**
<https://arxiv.org/abs/2309.03896>
- 2023** *Novel Topological Anderson insulating phases in the interacting Haldane model*
João S. Silva, **Eduardo V. Castro**, Rubem Mondaini, María A. H. Vozmediano, M. Pilar López-Sancho
<https://arxiv.org/abs/2307.16053>
- 2023** *Incommensurability enabled quasi-fractal order in 1D narrow-band moiré systems*
Miguel Gonçalves, Bruno Amorim, Flavio Riche, **Eduardo V. Castro**, Pedro Ribeiro
<https://arxiv.org/abs/2305.03800>
- 2023** *Incommensurability-Induced Enhancement of Superconductivity in One Dimensional Critical Systems*
Ricardo Oliveira, Miguel Gonçalves, Pedro Ribeiro, **Eduardo V. Castro**, Bruno Amorim
<https://arxiv.org/abs/2303.17656>
- 2023** *Renormalization group theory of one-dimensional quasiperiodic lattice models with commensurate approximants*
Miguel Gonçalves, Bruno Amorim, **Eduardo V. Castro**, Pedro Ribeiro
Phys. Rev. B **108**, L100201 (2023)
<https://doi.org/10.1103/PhysRevB.108.L100201>
- 2023** *Critical Phase Dualities in 1D Exactly Solvable Quasiperiodic Models*
Miguel Gonçalves, Bruno Amorim, **Eduardo V. Castro**, Pedro Ribeiro
Phys. Rev. Lett. **131**, 186303 (2023)
<https://doi.org/10.1103/PhysRevLett.131.186303>
- 2023** *Delocalization of topological surface states by diagonal disorder in nodal loop semimetals*
João Silva, Miguel A. N. Araújo, Miguel Gonçalves, Pedro Ribeiro, and **Eduardo V. Castro**

- Phys. Rev. B **107**, 045146 (2023)
<https://doi.org/10.1103/PhysRevB.107.045146>
- 2022** *Topological phase transitions for any taste in 2D quasiperiodic systems*
Tiago S. Gonçalves, Miguel Gonçalves, Pedro Ribeiro, Bruno Amorim, **Eduardo V. Castro**
<https://arxiv.org/abs/2212.08024>
- 2022** *Effect of gallium doping on structural and transport properties of the topological insulator Bi₂Se₃ grown by molecular beam epitaxy*
Daniel Brito, Ana Pérez-Rodríguez, Ishwor Khatri, Carlos José Tavares, Mario Amado, **Eduardo Castro**, Enrique Diez, Sascha Sadewasser, Marcel S Claro
J. Appl. Phys. **132**, 115107 (2022)
<https://doi.org/10.1063/5.0107004>
- 2022** *Spin triplet superconducting pairing in doped MoS₂*
Jingyao Wang, Xiao Zhang, Runyu Ma, Guang Yang, **Eduardo V. Castro**, Tianxing Ma
Phys. Rev. B **106**, 134513 (2022)
<https://doi.org/10.1103/PhysRevB.106.134513>
- 2022** *Hidden dualities in 1D quasiperiodic lattice models*
Miguel Gonçalves, Bruno Amorim, **Eduardo V. Castro**, Pedro Ribeiro
SciPost Phys. **13**, 046 (2022)
<https://doi.org/10.21468/SciPostPhys.13.3.046>
- 2022** *Edge-magnetism in Transition-metal Dichalcogenide Nanoribbons: Mean Field Theory and Determinant Quantum Monte Carlo*
Francisco M. O. Brito, Linhu Li, João M. V. P. Lopes, **Eduardo V. Castro**
Phys. Rev. B **105**, 195130 (2022)
<https://doi.org/10.1103/PhysRevB.105.195130>
- 2022** *Incommensurability-induced sub-ballistic narrow-band-states in twisted bilayer graphene*
Miguel Gonçalves, Hadi Z. Olyaei, Bruno Amorim, Rubem Mondaini, Pedro Ribeiro, **Eduardo V. Castro**
2D Mater. **9**, 011001 (2022)
<https://doi.org/10.1088/2053-1583/ac3259>
- 2021** *Instability of QBC systems to Topological Anderson Insulating phases*
Nicolau Sobrosa, Miguel Gonçalves, **Eduardo V. Castro**
<https://arxiv.org/abs/2110.03667>
- 2021** *Interplay of interactions, disorder and topology in the Haldane-Hubbard model*
Tian-Cheng Yi, Shijie Hu, **Eduardo V. Castro**, Rubem Mondaini
Phys. Rev. B **104**, 195117 (2021)
<http://dx.doi.org/10.1103/PhysRevB.104.195117>
- 2021** *Interplay of local order and topology in the extended Haldane-Hubbard model*
Can Shao, **Eduardo V. Castro**, Shijie Hu, Rubem Mondaini

- Phys. Rev. B **103**, 035125 (2021)
<http://dx.doi.org/10.1103/PhysRevB.103.035125>
- 2020** *Ballistic charge transport in twisted bilayer graphene*
Hadi Z. Olyaei, Bruno Amorim, Pedro Ribeiro, **Eduardo V. Castro**
<https://arxiv.org/abs/2007.14498>
- 2020** *Multi-orbital physics of edge-magnetism in a Hubbard model of transition-metal dichalcogenide nanoribbons: Comparing Mean Field Theory and Determinant Quantum Monte Carlo*
Francisco Brito, **Eduardo V. Castro**, João M.V.P. Lopes
EPJ Web of Conferences **233**, 03003 (2020)
<https://doi.org/10.1051/epjconf/202023303003>
- 2020** *Disorder driven multifractality transition in Weyl nodal loops*
Miguel Gonçalves, Pedro Ribeiro, **Eduardo V. Castro**, Miguel A. N. Araújo
Phys. Rev. Lett. **124**, 136405 (2020)
<https://doi.org/10.1103/PhysRevLett.124.136405>
- 2020** *Phononic phase gate with dark-soliton qubit*
Muzzamal I. Shaukat, **Eduardo V. Castro**, Hugo Terças
Phys. Scr. **95**, 055103 (2020)
<https://doi.org/10.1088/1402-4896/ab7651>
- 2019** *Dilute magnetism in graphene*
Frederico J. Sousa, B. Amorim, **Eduardo V. Castro**
<https://arxiv.org/abs/1901.08614>
- 2019** *Robust band of critical states in T-broken fermionic systems with lattice selective disorder*
Eduardo V. Castro, Raphael de Gail, M. Pilar López-Sancho, María A. H. Vozmediano
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<https://doi.org/10.1103/PhysRevResearch.1.033129>
- 2019** *Transmission across a bilayer graphene region*
Hadi Z. Olyaei, Pedro Ribeiro, **Eduardo V. Castro**
Phys. Rev. B **99**, 205436 (2019)
<https://doi.org/10.1103/PhysRevB.99.205436>
- 2019** *Slow sound in matter-wave dark soliton gases*
Muzzamal I. Shaukat, **Eduardo V. Castro**, Hugo Terças
Phys. Rev. B **99**, 205408 (2019)
<https://doi.org/10.1103/PhysRevB.99.205408>
- 2019** *Robust one-dimensionality at twin-grain-boundaries in MoSe₂*
Tilen Cadez, Linhu Li, **Eduardo V. Castro**, José M. P. Carmelo
Phys. Rev. B **99**, 155109 (2019)
<https://doi.org/10.1103/PhysRevB.99.155109>

- 2019** *Temperature-driven gapless topological insulator*
Miguel Gonçalves, Pedro Ribeiro, Rubem Mondaini, **Eduardo V. Castro**
Phys. Rev. Lett. **122**, 126601 (2019)
<https://doi.org/10.1103/PhysRevLett.122.126601>
- 2019** *Spontaneous generation of phononic entanglement in quantum dark-soliton qubits*
Muzzamal I. Shaukat, **Eduardo V. Castro**, Hugo Terças
Phys. Rev. A **99**, 042326 (2019)
<https://doi.org/10.1103/PhysRevA.99.042326>
- 2019** *Static and Dynamic Disorder in Topological Systems: Localized, Critical and Extended States*
Tilen Cadez, Rubem Mondaini, **Eduardo V. Castro**, Pedro D. Sacramento
Acta Physica Polonica A **135**, 1180 (2019)
<https://doi.org/10.12693/APhysPolA.135.1180>
- 2018** *Dirac points merging and wandering in a model Chern insulator*
Miguel Gonçalves, Pedro Ribeiro, **Eduardo V. Castro**
Europhys. Lett. **124**, 67003 (2018)
<https://doi.org/10.1209/0295-5075/124/67003>
- 2018** *Electronic spectral properties of incommensurate twisted trilayer graphene*
B. Amorim, **Eduardo V. Castro**
<https://arxiv.org/abs/1807.11909>
- 2018** *The Haldane model under quenched disorder*
Miguel Gonçalves, Pedro Ribeiro, **Eduardo V. Castro**
<https://arxiv.org/abs/1807.11247>
- 2018** *Symmetry Breaking and Lattice Kirigami*
Eduardo V. Castro, Antonino Flachi, Pedro Ribeiro, Vincenzo Vitagliano
Phys. Rev. Lett. **121**, 221601 (2018)
<https://doi.org/10.1103/PhysRevLett.121.221601>
- 2018** *Valley polarized magnetic state in hole-doped mono layers of transition metal dichalcogenides*
João E. H. Braz, B. Amorim, **Eduardo V. Castro**
Phys. Rev. B (Rapid Communication) **98**, 161406(R) (2018)
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- 2018** *Entanglement sudden death and revival in quantum dark-soliton qubits*
Muzzamal I. Shaukat, **Eduardo V. Castro**, Hugo Terças
Phys. Rev. A **98**, 022319 (2018)
<https://doi.org/10.1103/PhysRevA.98.022319>
- 2018** *Impact of complex adatom-induced interactions on quantum spin Hall phases*
Flaviano Jose dos Santos, Dario A. Bahamon, Roberto B. Muniz, Keith McKenna, **Eduardo V. Castro**, Johannes Lischner, Aires Ferreira
Phys. Rev. B (Rapid Communication) **98**, 081407(R) (2018)
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- 2018** *Strain manipulation of Majorana fermions in graphene armchair nanoribbons*
Zhen-Hua Wang, **Eduardo V. Castro**, Hai-Qing Lin
Phys. Rev. B (Rapid Communication) **97**, 041414(R) (2018)
<https://doi.org/10.1103/PhysRevB.97.041414>
- 2017** *Raise and collapse of strain-induced pseudo-Landau levels in graphene*
Eduardo V. Castro, Miguel A. Cazalilla, María A. H. Vozmediano
Phys. Rev. B (Rapid Communication) **96**, 241405(R) (2017)
<https://doi.org/10.1103/PhysRevB.96.241405>
- 2017** *The Haldane model under nonuniform strain*
Yen-Hung Ho, **Eduardo V. Castro**, Miguel A. Cazalilla
Phys. Rev. B **96**, 155446 (2017)
<https://doi.org/10.1103/PhysRevB.96.155446>
- 2017** *Collapse of Landau levels in Weyl semimetals*
Vicente Arjona, **Eduardo V. Castro**, María A. H. Vozmediano
Phys. Rev. B (Rapid Communication) **96**, 081110(R) (2017)
<https://doi.org/10.1103/PhysRevB.96.081110>
- 2017** *Quantum dark soliton (qubits) in Bose Einstein condensates*
Muzzamal I. Shaukat, **Eduardo V. Castro**, Hugo Terças
Phys. Rev. A **95**, 053618 (2017)
<https://doi.org/10.1103/PhysRevA.95.053618>
Selected for a Physics Synopsis: *A Dark Side for Qubits*
<https://physics.aps.org/synopsis-for/10.1103/PhysRevA.95.053618>
- 2016** *Strain manipulation of Majorana fermions in the honeycomb lattice*
Zhen-Hua Wang, **Eduardo V. Castro**, Hai-Qing Lin
<http://arxiv.org/abs/1601.05326>
- 2016** *Strain induced topological phase transition at zigzag edges of monolayer transition-metal dichalcogenides*
Linhu Li, **Eduardo V. Castro**, Pedro D. Sacramento
Phys. Rev. B **94**, 195419 (2016)
<https://doi.org/10.1103/PhysRevB.94.195419>
- 2016** *Absence of localization in a class of topological systems*
Eduardo V. Castro, Raphael de Gail, M. Pilar López-Sancho, María A. H. Vozmediano
Phys. Rev. B **93**, 245414 (2016)
<http://dx.doi.org/10.1103/PhysRevB.93.245414>
- 2015** *Anderson localization and topological transition in Chern insulators*
Eduardo V. Castro, María P. López-Sancho and María A. H. Vozmediano
Phys. Rev. B **92**, 085410 (2015)
<http://dx.doi.org/10.1103/PhysRevB.92.085410>

- 2014** *Chern band insulators in magnetic field*
Miguel A. N. Araújo, **Eduardo V. Castro**
J. Phys.: Condens. Matter **26**, 075501 (2014)
<http://dx.doi.org/10.1088/0953-8984/26/7/075501>
- 2014** *Hall conductivity as bulk signature of topological transitions in superconductors*
Pedro D. Sacramento, Miguel A. N. Araújo, **Eduardo V. Castro**
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<http://dx.doi.org/10.1209/0295-5075/105/37011>
- 2013** *Interaction driven phases in the honeycomb lattice from exact diagonalization*
Noel A. García-Martínez, Adolfo G. Grushin, Titus Neupert, Belén Valenzuela, **Eduardo V. Castro**
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<http://dx.doi.org/10.1103/PhysRevB.88.245123>
- 2013** *Charge instabilities and topological phases in the extended Hubbard model on the honeycomb lattice with enlarged unit cell*
Adolfo G. Grushin, **Eduardo V. Castro**, Alberto Cortijo, Fernando de Juan, María A. H. Vozmediano, and Belén Valenzuela
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<http://dx.doi.org/10.1103/PhysRevB.87.085136>
- 2013** *Change of an insulator's topological properties by a Hubbard interaction*
Miguel A. N. Araújo, **Eduardo V. Castro**, Pedro D. Sacramento
Phys. Rev. B **87**, 085109 (2013)
<http://link.aps.org/doi/10.1103/PhysRevB.87.085109>
- 2012** *Vacancy induced zero energy modes in graphene stacks: The case of ABC trilayer*
Eduardo V. Castro, María P. López-Sancho and María A. H. Vozmediano
Sol. Stat. Comm. **152**, 1483 (2012)
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- 2012** *Scattering by flexural phonons in suspended graphene under back gate induced strain*
Héctor Ochoa, **Eduardo V. Castro**, M. I. Katsnelson, and F. Guinea
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- 2011** *Topological Fermi liquids from Coulomb interactions in the doped honeycomb lattice*
Eduardo V. Castro, Adolfo G. Grushin, Belén Valenzuela, María A. H. Vozmediano, Alberto Cortijo, and Fernando de Juan
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<http://dx.doi.org/10.1103/PhysRevLett.107.106402>
- 2011** *The effect of pressure on the magnetism of bilayer graphene*
Eduardo V. Castro, María P. López-Sancho and María A. H. Vozmediano
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<http://dx.doi.org/10.1103/PhysRevB.84.075432>

- 2011** *Temperature dependent resistivity in bilayer graphene due to flexural phonons*
Héctor Ochoa, **Eduardo V. Castro**, M. I. Katsnelson, and F. Guinea
Phys. Rev. B **83**, 235416 (2011)
<http://dx.doi.org/10.1103/PhysRevB.83.235416>
- 2010** *Limits on charge carrier mobility in suspended graphene due to flexural phonons*
Eduardo V. Castro, Héctor Ochoa, M. I. Katsnelson, R. V. Gorbachev, D. C. Elias,
K. S. Novoselov, A. K. Geim, and F. Guinea
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<http://dx.doi.org/10.1103/PhysRevLett.105.266601>
- 2010** *Quantum quench dynamics and population inversion in bilayer graphene*
Balázs Dóra, **Eduardo V. Castro**, and Roderich Moessner
Phys. Rev. B **82**, 125441 (2010)
<http://dx.doi.org/10.1103/PhysRevB.82.125441>
- 2010** *Electronic properties of a biased graphene bilayer*
Eduardo V. Castro, K. S. Novoselov, S. V. Morozov, N. M. R. Peres, J. M. B.
Lopes dos Santos, Johan Nilsson, F. Guinea, A. K. Geim, and A. H. Castro Neto
J. Phys.: Condens. Matter **22**, 175503 (2010)
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- 2010** *Substitutional disorder and charge localization in manganites*
Eduardo V. Castro and J. M. B. Lopes dos Santos
J. Phys.: Condens. Matter **22**, 075601 (2010)
<http://dx.doi.org/10.1088/0953-8984/22/7/075601>
- 2010** *A new type of vacancy-induced localized states in multilayer graphene*
Eduardo V. Castro, María P. López-Sancho and María A. H. Vozmediano
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- 2009** *Valley symmetry breaking in bilayer graphene: a test of the minimal model*
Masaaki Nakamura, **Eduardo V. Castro** and Balázs Dóra
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- 2009** *Pinning and switching of magnetic moments in bilayer graphene*
Eduardo V. Castro, Maía P. López-Sancho and María A. H. Vozmediano
New J. Phys. **11**, 095017 (2009)
<http://dx.doi.org/10.1088/1367-2630/11/9/095017>
- 2008** *Bilayer graphene: gap tunability and edge properties*
Eduardo V. Castro, N. M. R. Peres, J. M. B. Lopes dos Santos, F. Guinea, and A.
H. Castro Neto
J. Phys.: Conf. Series **129**, 012002 (2008)
<http://dx.doi.org/10.1088/1742-6596/129/1/012002>

- 2008** *First order ferromagnetic phase transition in the low electronic density regime of a biased graphene bilayer*
T. Stauber, **Eduardo V. Castro**, N. A. P. Silva, and N. M. R. Peres
J. Phys.: Condens. Matter **20**, 335207 (2008)
<http://dx.doi.org/10.1088/0953-8984/20/33/335207>
- 2008** *Localized states at zigzag edges of multilayer graphene and graphite steps*
Eduardo V. Castro, N. M. R. Peres, and J. M. B. Lopes dos Santos
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<http://dx.doi.org/10.1209/0295-5075/84/17001>
- 2008** *Low density ferromagnetism in biased bilayer graphene*
Eduardo V. Castro, N. M. R. Peres, T. Stauber, and N. A. P. Silva
Phys. Rev. Lett. **100**, 186803 (2008)
<http://dx.doi.org/10.1103/PhysRevLett.100.186803>
- 2008** *Localized states at zigzag edges of bilayer graphene*
Eduardo V. Castro, N. M. R. Peres, J. M. B. Lopes dos Santos, A. H. Castro Neto, and F. Guinea
Phys. Rev. Lett. **100**, 026802 (2008)
<http://dx.doi.org/10.1103/PhysRevLett.100.026802>
- 2008** *Magnetic structure at zigzag edges of graphene bilayer ribbons*
Eduardo V. Castro, N. M. R. Peres, and J. M. B. Lopes dos Santos
J. Optoelectron. Adv. Materials **10**, 1716 (2008)
<http://arxiv.org/abs/0801.2788>
- 2007** *Algebraic solution of a graphene layer in a transverse electric and perpendicular magnetic fields*
N. M. R. Peres and **Eduardo V. Castro**
J. Phys.: Condens. Matter **19**, 406231 (2007)
<http://dx.doi.org/10.1088/0953-8984/19/40/406231>
- 2007** *Biased bilayer graphene: semiconductor with a gap tunable by electric field effect*
Eduardo V. Castro, K. S. Novoselov, S. V. Morozov, N. M. R. Peres, J. M. B. Lopes dos Santos, Johan Nilsson, F. Guinea, A. K. Geim, and A. H. Castro Neto
Phys. Rev. Lett. **99**, 216802 (2007)
<http://dx.doi.org/10.1103/PhysRevLett.99.216802>
- 2007** *Gaped graphene bilayer: disorder and magnetic field effects*
Eduardo V. Castro, N. M. R. Peres, and J. M. B. Lopes dos Santos
phys. stat. sol. (b) **244**, 2311 (2007)
<http://dx.doi.org/10.1002/pssb.200674604>
- 2006** *Site dilution of quantum spins in the honeycomb and square lattices*
Eduardo V. Castro and N. M. R. Peres
Physica B **378-380**, 137 (2006)
<http://dx.doi.org/10.1016/j.physb.2006.01.135>

- 2006** *Site dilution of quantum spins in the honeycomb lattice*
Eduardo V. Castro, N. M. R. Peres, K. S. D. Beach, and Anders W. Sandvik
Phys. Rev. B **73**, 054422 (2006)
<http://dx.doi.org/10.1103/PhysRevB.73.054422>
- 2004** *Double exchange model for magnetic hexaborides*
Vitor M. Pereira, J. M. B. Lopes dos Santos, **Eduardo V. Castro**, and A. H. Castro Neto
Phys. Rev. Lett. **93**, 147202 (2004)
<http://dx.doi.org/10.1103/PhysRevLett.93.147202>

B Book Chapters

- 2019** *Twisted bilayer graphene: Low-energy physics, electronic and optical properties*
Gonçalo Catarina, Bruno Amorim, **Eduardo V. Castro**, João M. V. P. Lopes, Nuno Peres
in *Handbook of Graphene: Volume 3*, Edited by Mei Zhang (John Wiley & Sons, New Jersey, 2019), Chap. 6, pp. 177-230
- 2019** *Changing the topology of electronic systems through interactions or disorder*
M. A. N. Araújo, **Eduardo V. Castro**, and P. D. Sacramento
in *Advanced Topological Insulators*, Edited by Ashutosh Tiwari and Xiaoyu Yang (John Wiley & Sons, New Jersey, 2019), Chap. 5, pp. 159-205
- 2008** *An introduction to the Physics of Graphene*
N. M. R. Peres, **Eduardo V. Castro**, J. M. B. Lopes dos Santos, F. Guinea, and A. H. Castro Neto
in *Avanços nas Ciências Físicas*, Edited by L. D. Carlos (Aveiro: Universidade de Aveiro, 2008)
- 2007** *An introduction to the physics of graphene layers*
Eduardo V. Castro, N. M. R. Peres, J. M. B. Lopes dos Santos, F. Guinea, and A. H. Castro Neto
in *Strongly Correlated Systems, Coherence and Entanglement*, Edited by J. M. P. Carmelo, P. D. Sacramento, J. M. B. Lopes dos Santos, and V. Rocha Vieira (World Scientific, Singapore, 2007), Chap. 4, pp. 111-144
- 2007** *Disorder in the double exchange model*
V. M. Pereira, **Eduardo V. Castro**, and J. M. B. Lopes dos Santos
in *Strongly Correlated Systems, Coherence and Entanglement*, Edited by J. M. P. Carmelo, P. D. Sacramento, J. M. B. Lopes dos Santos, and V. Rocha Vieira (World Scientific, Singapore, 2007), Chap. 11, pp. 279-310

C Presentations at scientific meetings

Oral

- 2022** *(invited) 2D Transition Metal Dichalcogenides: a playground for interaction effects*
José Carmelo-Fest, University of Minho, Braga, 8-9 July
<https://www.fc.up.pt/carmelo-fest/program/>
- 2021** *(invited) Twisted bilayer graphene as a quasi-disordered system*
Vitor's Conference on Condensed and Other Matters, Online, 13-14 September
<https://sites.google.com/tecnico.ulisboa.pt/vitors-conference/schedule?authuser=0>
- 2021** *Incommensurability-induced sub-ballistic narrow-band-states in tBLG*
American Physical Society March-Meeting, Online, 21-25 March
- 2019** *(invited) Topological matter in 2D: effects of disorder and interactions*
Condensed Matter Physics National Conference, University of Porto, Porto, Portugal, 8-10 May
- 2019** *(invited) Topology, disorder, and interactions in 2D matter*
International Conference on Surfaces, Coatings and Nanostructured Materials (NANOSMAT-Mediterranean), Session: 2D Materials, Mohamed V University, Rabat, Morocco, 2-4 May
- 2018** *(invited) Topological matter under strain*
Workshop on Field Theory and Condensed Matter Physics, University of Minho, Braga, Portugal, 19-20 April
- 2018** *Dilute magnetism in graphene*
nanoPT 2018 - Nanoscience and Nanotechnology International Conference, Lisboa, Portugal, 7-9 February
- 2016** *(invited) Possible spin polarized ground state in graphene and transition metal dichalcogenides*
Recent Progress in Spintronics of 2D Materials, Hsinchu, Taiwan, 13-16 November
- 2016** *(invited) Graphene and other 2D materials, and why we should care*
C2TN Workshop on Advanced Materials, IST-CTN, Lisbon, Portugal, 10 November
- 2016** *Raise and collapse of strain-induced pseudo-Landau levels in graphene*
Workshop on Correlations, Integrability, and Criticality in Quantum Systems, Évora, Portugal, 24-28 October
- 2016** *Single valley magnetism in hole-doped monolayers of transition metal dichalcogenides*
26th General Conference of the Condensed Matter Division of the European Physical Society, Groningen, The Netherlands, 4-9 September

- 2016** *(invited) Absence of Anderson localization in class-A Dirac systems: a lattice perspective*
Conference on interactions and topology in Dirac systems, ICTP, Trieste, Italy, 3-9 August
- 2016** *(invited) Phases with non-trivial topology in graphene and transition metal dichalcogenides*
nanoPT 2016 - Nanoscience and Nanotechnology International Conference, INL, Braga, Portugal, 16-19 February
- 2015** *(invited) Graphene and beyond: electronic properties of novel 2D materials*
SMIB-2015 Semiconductors Meet Ion Beams, Workshop in the frame of the projects GreenLight and Nanowires, IST-CTN, Lisbon, Portugal, 25-26 June
- 2015** *Disorder induced topological transition in graphene with random adatoms*
American Physical Society March-Meeting, San Antonio, Texas, USA, 2-6 March
- 2015** *Randomness and topology in graphene*
Mini-Workshop on Theoretical Condensed Matter Physics, Instituto Superior Técnico, Lisbon, Portugal, 6 January
- 2014** *Interaction effects in low-buckled graphene-like crystals*
XXXVIII International Conference on Theoretical Physics: Correlations and coherence at different scales, Ustron, Poland, 5-10 September
- 2014** *(invited) Graphene: a paradigm in fundamental and applied physics*
FÍSICA 2014 – 19ª Conferência Nacional de Física e 24º Encontro Ibérico para o Ensino da Física, Instituto Superior Técnico, Lisbon, Portugal, 2-4 September
- 2013** *Disordered Chern insulators: the role of vacancies*
Mini-Workshop on Theoretical Condensed Matter Physics, Instituto Superior Técnico, Lisbon, Portugal, 12 November
- 2013** *Topological phases in the honeycomb lattice from fermion interactions: robustness considerations*
in the Program on Correlations and Topology in Quantum Matter - 2013, held in the Beijing Computational Science Research Center, Beijing, China, 3-25 July
- 2013** *(invited) Silicene and MoS₂: 2D electronic physics beyond graphene*
Workshop on Graphene and other 2D materials: A roadmap for Portugal, Braga, Portugal, 18 June
- 2012** *Topological phases driven by electron interactions in certain two-dimensional lattices*
Workshop on Correlations and Coherence in Quantum Systems, Évora, Portugal, 8-12 October
- 2011** *Topological Fermi liquids in the doped Honeycomb lattice*
The new generation in strongly correlated electron systems – NGSCES 2011, Santiago de Compostela, Spain, 4-8 July

- 2011** *Mobility of suspended bilayer graphene at finite temperature*
ImagineNano, Bilbao, Spain, 11-14 April
- 2011** *Limits on electron quality in suspended graphene due to flexural phonons*
American Physical Society March-Meeting, Dallas, Texas, USA, 21-25 March
- 2010** (invited) *Electron – acoustic phonon scattering in graphene*
III Workshop on Modern Trends in Field Theory, Centro de Física do Porto, Porto, Portugal, 21-23 October
- 2010** *Quantum quench dynamics and population inversion in bilayer graphene*
E-MRS 2010 Spring Meeting, Strasbourg, France, 7-11 June
- 2010** *Acoustic phonon scattering in doped suspended graphene*
National Meeting of Condensed Matter Physics 2010, Instituto Superior Técnico, Lisbon, Portugal, 18-19 February
- 2009** *Asymmetry gap, edges and vacancies in graphene bilayer*
32nd International Symposium on Dynamical Properties of Solids (DyProSo XXXII), University of Antwerp, Antwerp, Belgium, 13-17 September
- 2008** *Gap tunability in bilayer graphene*
22nd General Conference of the Condensed Matter Division of the European Physical Society, Rome, Italy, 25-29 August
- 2008** (invited) *Bilayer graphene: gap tunability and edge properties*
International Conference on Theoretical Physics “Dubna-Nano2008”, Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna, Moscow Region, Russia, 7-11 July
- 2008** *Localized states at zigzag edges of graphene multilayers and graphite steps*
American Physical Society March-Meeting, New Orleans, Louisiana, USA, 10-14 March
- 2007** *Localized states at zigzag edges of bilayer graphene*
31st International Symposium on Dynamical Properties of Solids (DyProSo XXXI), University of Porto, Porto, Portugal, 25-29 September
- 2007** *Localized states and magnetic order at zigzag edges of bilayer graphene*
Exotic States in Materials with Strongly Correlated Electrons (ESM’07 International Workshop), Sinaia, Romania, 7-10 September
- 2007** *Biased graphene bilayer: a tunable gap semiconductor*
4th NanoSpain Workshop, Seville, Spain, 12-15 March
- 2007** *Biased bilayer graphene: semiconductor with a gap tunable by electric field effect*
American Physical Society March-Meeting, Denver, Colorado, USA, 5-9 March
- 2006** *Graphene bilayer: bias voltage and magnetic field effects*
Electron Correlations in Nano- and Macrosystems, Ustron, Poland, 9-14 September

2006 *First-order phase transition induced by disorder in a model for manganites*
American Physical Society March-Meeting, Baltimore, Maryland, USA, 13-17 March

2005 *Dilution of the 2D Heisenberg antiferromagnet with honeycomb lattice*
Workshop on Complex Behaviour in Electronic Systems, University of Minho, Braga, Portugal, 15-16 September

Posters

2016 *Disorder induced topological transitions in graphene with random heavy adatoms*
26th General Conference of the Condensed Matter Division of the European Physical Society, Groningen, The Netherlands, 4-9 September

2012 *Spontaneous breakdown of time reversal symmetry in the doped honeycomb lattice with enlarged unit cell*
Gordon Research Conferences – Correlated Electron Systems: Correlations and Topology in Electron Systems, Mount Holyoke College, South Hadley MA , USA, 24-29 June

2010 *Temperature dependent resistivity due to flexural phonons in single and bilayer graphene*
11th Trends in Nanotechnology International Conference (TNT2010), International Iberian Nanotechnology Center - INL, Braga, Portugal, 6-10 September

2010 *Scattering by out-of-plane acoustic phonons in doped suspended graphene*
ITN Nanoelectronics Meeting 2010 on “Nanoelectronics - Concepts, Theory and Modeling”, Jacobs University Bremen, Bremen, Germany, 17-21 May

2009 *A new type of vacancy induced localized states in multilayer graphene*
GDR09 Meeting – Nanotube and Graphene Science and Applications, Coma-Ruga, Catalonia, Spain, 19-23 October

2009 *A new type of vacancy induced localized states in multilayer graphene*
Graphene Workshop in Benasque, Centro de Ciencias de Benasque Pedro Pascual, Benasque, Spain, July 25 - August 8

2009 *Graphene bilayer: a tunable gap semiconductor*
Graphene Week 2009, Universitätszentrum Obergurgl, Ötz Valley, near Innsbruck, Austria, 2-7 March

2008 *Graphene bilayer: a tunable gap semiconductor*
2nd Workshop on “Low-Dimensional Structures: Properties and Applications”, University of Aveiro, Aveiro, Portugal, January 31 - February 1

2006 *Graphene bilayer: a tight-binding description*
INSTANS Summer Conference, Villa Olmo, Como, Italy, 12-16 June

- 2005** *A-site randomness in manganites: a variational mean-field approach*
I²CAM Advanced Workshop on “Strongly Correlated Electrons: Diverse Examples and Unifying Themes”, Institut Scientifique de Cargèse, Corsica, France, 8-20 August
- 2005** *Site dilution of quantum spins in the honeycomb and square lattices*
The International Conference on Strongly Correlated Electron Systems, Vienna University of Technology – Institute of Solid State Physics, Vienna, Austria, 26-30 July

D Seminars, Lectures, and Outreach

Seminars

- 2023** *Quasiperiodicity, moiré, and why are they linked in certain electron systems*
Universidade de Coimbra, Portugal, November 22
- 2019** *Effects of disorder and interactions in topological matter*
University of Tunis El Manar, Tunisia, September 5
- 2019** *Strain effects in Dirac matter*
University of Tunis El Manar, Tunisia, September 4
- 2019** *Effects of disorder and interactions in 2D topological matter*
Beijing Normal University, Beijing, China, August 2
- 2016** *Disordered electronic systems, novel 2D materials, and topological matter: examples of current research in overlapping subjects*
Computational Science Research Center - CSRC, Beijing, China, July
- 2015** *Disordered topological systems, and what they have to do with graphene*
Regensburg University, Regensburg, Germany, June
- 2013** *Symmetry breaking in graphene and related systems*
CENTRA, Instituto Superior Técnico, Lisbon, Portugal, October
- 2013** *Topological phases in the honeycomb lattice from fermion interactions: robustness considerations*
Computational Science Research Center - CSRC, Beijing, China, July
- 2013** *Graphene and other 2D materials: interesting properties with technological potential*
INESC-MN, Lisbon, Portugal, April
- 2012** *The unconventional electron-lattice coupling in graphene and related systems*
Institute of Physics (IOP), Chinese Academy of Sciences, Beijing, China, July

- 2012** *GRAFENO: física fundamental na ponta do lápis*
“Ciclo de colóquios, 2º semestre 2012”, Physics Departement, IST, Lisbon, Portugal, February
- 2010** *Graphene – the thinnest metallic membrane*
ITN seminars, ITN, Lisbon, Portugal
- 2010** *Graphene – the wonder material*
CFTC, University of Lisbon, Lisbon, Portugal
- 2010** *Resistivity’s temperature dependence in doped suspended graphene*
Department of Physics and Astronomy, Faculty of Sciences of University of Porto, Porto, Portugal.
- 2010** *Temperature dependent resistivity in doped suspended graphene: the role of phonons*
Department of Physics, Budapest University of Technology and Economics, Budapest, Hungary.
- 2010** *Flexural phonon limited mobility in doped suspended graphene*
Condensed Matter Theory seminar, Physics Department, Boston University, Boston, USA.
- 2009** *Graphene bilayer physics: asymmetry gap, edges and vacancies*
Seminars of the Theory Group, Instituto de Ciencia de Materiales de Madrid - CSIC, Madrid, Spain.
- 2008** *Graphene double layer and its electric field effect*
Condensed Matter Seminar, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany.
- 2008** *Looking at graphene with the naked eye*
Scientific Jam Session, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany.
- 2006** *Electronic properties of a graphene bilayer*
GCEP - Group of Complexity and Electronic Properties, Center of Physics, University of Minho, Braga, Portugal.

Lectures

- 2022** (lecture) *Introduction to the theory of Localization*
“Quantum Matter Summer School 2022”, Quantum Matter - Materials and Concepts summer training program, IPT, Tomar, Portugal, 3-7 September
- 2022** (lecture) *2D Materials*
“Toddler’s School on Quantum Matter”, Online, Quantum.Matter@PT network, 20-21 March

- 2021** (lecture) *Topological Quantum Matter with Examples*
 “Quantum Matter Summer School 2021”, Quantum Matter - Materials and Concepts summer training program, IPB-ESTG, Bragança, Portugal, 15-18 September
- 2021** (lecture) *2D Materials*
 “Toddler’s School on Quantum Matter”, Online, Quantum.Matter@PT network, 20-21 March
- 2020** (lecture) *Topologia e Matéria Condensada*
 “Quantum Matter Summer School 2020”, Quantum Matter - Materials and Concepts summer training program, Caramulo, Portugal, 31 August - 04 September
- 2020** (lecture) *Berry Phase in Multi-band Systems*
 “Topology in Condensed Matter” online sessions, Quantum.Matter@PT network, July
- 2017** (lecture) *Materiais do mundo 2D*
 Lecture given to PhD students of the doctoral program on “Advanced Materials and Processing” (AdvaMTech), Instituto Superior Técnico, Lisbon, Portugal, July
- 2012** (lecture) *Introduction to graphene: Part I*
 (lecture) *Introduction to graphene: Part II*
 (lecture) *Electron-lattice coupling in graphene*
 (lecture) *Electron-electron interactions in graphene and related materials*
 CFIF short course: Mini course on graphene physics, CFIF, IST, Lisbon, Portugal, November
- 2011** (lecture) *Grafeno: da ponta do lápis ao Nobel*
 “Odisséia pela Física” lecture, Physics Department, Aveiro University, Aveiro, Portugal
- 2010** (lecture) *Graphene in perpendicular magnetic field*
 (lecture) *Graphene as an elastic membrane I*
 (lecture) *Graphene as an elastic membrane II*
 (lecture) *Graphene bilayer and its tunable gap*
 Invited lectures at School on New Materials: Graphene & Applications, Center of Physics and Mathematics, Rabat, Morocco, 06-11 December
- 2010** (lecture) *T– dependent resistivity in doped suspended graphene*
 Applied lecture at Mathematica Summer School on Theoretical Physics (2nd edition) – Condensed Matter and Two-Dimensional Physics, Theoretical Physics Center of Porto, 11-16 July.
- 2010** (lecture) *Tunable gap and quantum quench dynamics in bilayer graphene*
 Applied lecture at Mathematica Summer School on Theoretical Physics (2nd edition) – Condensed Matter and Two-Dimensional Physics, Theoretical Physics Center of Porto, 11-16 July.

Outreach

(in portuguese)

- 2022** *Apontamentos da minha investigação em Matéria Condensada teórica*
“SpaceOff Talks”, Physics and Astronomy Department, Faculty of Sciences of the University of Porto, Porto, Portugal, December
- 2022** *Física no jogos olímpicos: a importância da rotação*
Seminar oriented to junior high school and high school students, given at
- Escola Básica e Secundária Rodrigues de Freitas, Porto
- Escola Básica Adriano Correia de Oliveira, Vila Nova de Gaia
November
- 2022** *Introdução à Matéria Condensada: dos Segredos da Natureza à Evolução tecnológica*
Colloquium for BSc students in Physics, “Give me more matter - but make it condensed” conference, promoted by the national Physics students network Physis, Physics and Astronomy Department, Faculty of Sciences of the University of Porto, Porto, Portugal, September
- 2021** *Materiais quânticos - Quando a ficção se torna realidade*
Seminar oriented to high school students and teachers, “Semana da Ciência e da Tecnologia 2021”, online, November
- 2021** *Matéria Quântica: Segredos da Natureza e Evolução tecnológica*
General audience colloquium, “Quantum Matter Summer School 2021”, Quantum Matter - Materials and Concepts summer training program, IPB-ESTG, Bragança, Portugal, September
- 2018** *Apontamentos da minha investigação em Matéria Condensada teórica*
“Myresearch-PhysikUp”, Physics and Astronomy Department, Faculty of Sciences of the University of Porto, Porto, Portugal, May
- 2017** *Física na planolândia*
“A desafiar os limites da ciência e tecnologia, Encontros com candidatos ao MEFT - Mestrado Integrado em Engenharia Física e Tecnológica”, Instituto Superior Técnico, Lisbon, Portugal, June
- 2017** *What is topological in matter? A very, very... very short talk on the Nobel prize in physics 2016*
IV Jornadas de Engenharia Física, XVI Semana da Física, Instituto Superior Técnico, Lisbon, Portugal, February
- 2016** *Física na planolândia*
“A desafiar os limites da ciência e tecnologia, Encontros com candidatos ao MEFT - Mestrado Integrado em Engenharia Física e Tecnológica”, Instituto Superior Técnico, Lisbon, Portugal, June
- 2016** *Momento angular nos jogos olímpicos. É mesmo importante?*
XIX Semana da Física, Instituto Superior Técnico, Lisbon, Portugal, February

- 2015** *A física escondida na ponta do lápis*
“A desafiar os limites da ciência e tecnologia, Encontros com candidatos ao MEFT - Mestrado Integrado em Engenharia Física e Tecnológica”, Instituto Superior Técnico, Lisbon, Portugal, June
- 2015** *Iluminando a Planolândia: a impotência da luz na física do grafeno e outros materiais 2D*
Initiative “Light in Physics”, Portuguese starting event for the International Year of Light, Lisbon, March
- 2015** *PLANOLÂNDIA: o mundo do grafeno e outros materiais 2D*
“Encontro nacional de estudantes de Física, ENEF’15”, Instituto Superior Técnico, Lisbon, Portugal, February
- 2015** *Podemos ver o material mais fino do mundo?*
XVIII Semana da Física, Instituto Superior Técnico, Lisbon, Portugal, February
- 2014** *A física escondida na ponta do lápis*
“A desafiar os limites da ciência e tecnologia, Encontros com candidatos ao MEFT - Mestrado Integrado em Engenharia Física e Tecnológica”, Instituto Superior Técnico, Lisbon, Portugal, June
- 2014** *PLANOLÂNDIA: o mundo do grafeno e suas aplicações*
XVII Semana da Física, Instituto Superior Técnico, Lisbon, Portugal, February
- 2013** *GRAFENO: física fundamental na ponta do lápis*
“Seminário para o Mestrado em Física”, Physics Department, FCUL, Lisbon, Portugal, December
- 2013** *A física escondida na ponta do lápis*
“A desafiar os limites da ciência e tecnologia, Encontros com candidatos ao MEFT - Mestrado Integrado em Engenharia Física e Tecnológica”, Instituto Superior Técnico, Lisbon, Portugal, June
- 2013** (for general audience) *O que era ficção e é agora realidade — Perspectiva de um físico de matéria condensada*
Jornadas de Engenharia Física, XVI Semana da Física, Instituto Superior Técnico, Lisbon, Portugal, February